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Editor - Captain L. B. Marshall, MC, USN (RET)

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Policy

The U. S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be nor susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

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Notice

Due to the critical shortage of medical officers, the Chief, Bureau of Medicine and Surgery, has recommended, and the Chief of Naval Personnel has concurred, that Reserve medical officers now on active duty who desire to submit requests for extension of their active duty for a period of three months or more will be given favorable consideration.

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Residency Training in the Navy

Applications for residency training are requested from Regular officers and those Reserve officers who have completed their obligated service under the Universal Military Training and Service Act, as amended. Reserve officers with obligated service may become eligible for training upon transfer to the Regular Navy.

Training is available for Regular officers in all of the major medical specialties. It is available for Reserve officers in Pathology, Orthopedic Surgery, Obstetrics and Gynecology, Pediatrics, Urology, Anesthesiology, Otolaryngology, Dermatology and Syphilology, Ophthalmology, and Internal Medicine.

Members of the current intern class who are eligible and have been accepted for training may start their residency immediately on completion of their internship. It is now the desire of the Bureau of Medicine and Surgery to continue a resident in training without interruption until he has completed the formal training requirements leading to certification by an American Specialty Board. This procedure will be strictly adhered to in every case where the demands of the service permit, and providing the officer shows satisfactory progress. (ProfDiv, BuMed)

Deputy and Assistant Chief of the Navy's Bureau of Medicine and Surgery

Rear Admiral Bruce E. Bradley, (MC) USN, has reported for duty as the Deputy and Assistant Chief of the Bureau of Medicine and Surgery. He succeeds Rear Admiral Bartholomew W. Hogan (MC) USN, who was appointed Surgeon General of the Navy and Chief of the Bureau of Medicine and Surgery on February 15, 1955.

Admiral Bradley was born on September 29, 1902, in Raleigh, N.C., son of the late William Harrison and Bessie Myrtle (Hicock) Bradley. He attended Woodrow Wilson High School in Portsmouth, Va., William and Mary College, Williamsburg, Va., and the University of Virginia, Charlottesville, receiving the degree of Doctor of Medicine from the latter in 1926. He was commissioned Lieutenant (jg) in the Medical Corps of the U.S. Navy immediately following graduation, and through subsequent promotions attained the rank of Rear Admiral to date from July 1, 1954. He is a member of Pi Kappa Alpha and Nu Sigma Nu fraternities, and of the American Medical Association.

In addition to the Legion of Merit, Rear Admiral Bradley has the Second Nicaraguan Campaign Medal; American Defense Service Medal; Asiatic-Pacific Campaign Medal with one engagement star; American Campaign Medal; World War II Victory Medal; National Defense Service Medal; and the Medal of Merit awarded by the Government of Nicaragua.

Married to the former Miss Gertrude Elizabeth Mueller of Lakewood, New Jersey, he has a daughter, Gertrude Elizabeth (Mrs. Harold C.) Urschel of Boston, Massachusetts, and a son, Bruce E. Bradley, Jr., a student at Princeton University. Admiral and Mrs. Bradley have taken residence at 2326 South Joyce Street, Arlington, Virginia. (TIO, BuMed)

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"Commendatory Letter"

The following letter to the Commanding Officer of the Navy Medical Research Institute is published with the approval of the C.O., the Surgeon General and the author. A copy of Dr. Chamberlain's letter and the commendatory comments made by the Commanding Officer and the Surgeon General have been made a part of Dr. Sewell's record.

> "On two occasions Dr. William H. Sewell has come to New York City with vascular grafts for two critical operations in which Dr. Sewell and the Blood Vessel Bank in Bethesda, under your auspices, were tremendously important in saving the lives of these two patients. This note is simply an expression of gratitude to you

and your staff for the attitude and leadership you have shown in the advancement of this important new aspect of cardiovascular surgery.

The first patient was done at the Fort Hamilton Veterans Hospital and this patient, a 63 year-old man, had four aneurysms, one of which was on the undersurface of the aortic arch. This aneurysm, plus three large aneurysms in the descending aorta, necessitated a by-pass from the ascending aorta to the abdominal aorta, while the aneurysm in the arch and the other aneurysms were resected and the abnormal aorta replaced with an aorta from your vascular bank. This method of by-passing the diseased aorta, I believe, was developed in your laboratory by Drs. Sewell, Alley, (Civ. Cons. from N. Y. to NMRI) and others on your staff.

The second case was a 17 year-old girl with cerebral hypertension and a left hemiplegia. The cause of the cerebral hypertension was unknown until an angiogram revealed that the patient had coming off the ascending aorta only two blood vessels which were the left and right common carotid. The cerebral hypertension was responsible for her hemiplegia. No pulses were palpable in the upper or lower extremities and the angiogram revealed several aneurysms distal to the left common carotid. At operation innumerable congenital anomalies were present and it was not surprising that the pulses were not palpable in the patient's extremities. It was necessary to take one of your blood vessels from your bank and build the patient a new aortic arch in order to provide her with a normal anatomical set-up. Up to the present time both of these patients have done well.

Again may I thank you for willingness to help us out of these civilian difficulties and to compliment you on your pioneering attitude and the encouragement you have given all of us who are interested in this aspect of cardiovascular surgery. It is another beautiful example of the important contributions that one of the Armed Forces can and has made to civilian medicine and surgery."

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Rigid and Flexible Prostheses for Arterial Replacement

The author has devoted a great deal of time and effort to the simplification of the procedure for obtaining and preserving arterial grafts for reconstruction of major arteries, for long periods of time. Some of these measures have included the use of rapidly frozen grafts, a simplified technique for freeze-drying and sealing of such grafts, and, more recently, a method for the sterilization of grafts taken without aseptic precautions prior to the freeze-drying. The author and associates have also extensively investigated the possibilities of the use of freeze-dried heterografts, sterilized by the ethylene oxide method, and have used these in a number of patients with excellent results. In spite of these advances, they have continued to look forward to the possibility of using material of nonbiologic origin which would have the advantages of being completely available in all sizes and shapes in all areas without the difficulties of having to secure a graft of human or animal origin and without the necessity for the meticulous processing involved in even the simplest currently available methods. As a result of this work, these surgeons believe that they can routinely replace segments of large vessels with reproducible success. This has resulted in the laying down of certain criteria which they believe to be important in the successful establishment of such a rigid prosthetic substitute.

First, the material employed should be relatively biologically inert. Second, it must have adequate strength; this implies that it must be able to withstand all stresses to which it can be normally subjected in the body, and that it will not deteriorate with time to a degree which will be harmful. Third, it must resist clotting. Fourth, the internal surface of the prosthesis must be extremely smooth. Fifth, there must be a smooth junction between the vessel and the tube in order to minimize turbulence and to prevent the laying down of fibrin at the tube-vessel junction. Sixth, the anastomosis between the tube and the vessel must be effected by a method which does not produce necrosis of the arterial wall at the point of junction.

Among the materials which have been used are methyl methacrylate (Lucite, Plexiglas), polyethylene, Teflon, Kel-F, nylon, stainless steel, Vitallium, and other metals. In addition, these and other materials have been utilized coated with various forms of silicone. More recently, silicone rubber has been utilized. However, of all these materials, methyl methacrylate has been outstanding. Its hemo-repellancy, as tested by the author and others, has been well maintained after prolonged tissue contact, and in large vessels down to the size of the canine aorta, they have been able to maintain the patency regularly.

The method employing a rigid tube and multiple-point fixation has been extremely satisfactory in selected locations. The rigidity of the tube makes its application impractical in areas where the prosthesis crosses a major

flexion crease. Similarly, the method is difficult in application when multiple branches of variable size, shape, and angle occur. Because of the necessity of close approximation of size of the prosthesis to the vessel above and below, it is necessary to have a very large selection of tubes, varying both in diameter and length in order to meet the numerous conditions. In very small vessels where the ratio of the thickness of the prosthetic wall in relation to diameter becomes great, factors of increasing turbulent flow and so on make its use less desirable. In contrast to the disadvantages, in sites where it is applicable, it offers an extremely simple and highly satisfactory method. Thus, in the aorta itself, where the range of the diameter is relatively limited and where major branching is relatively constant, this method has its ideal application.

Being fully aware of the limitations of rigid prostheses, and postulating in the original criteria that, in addition to those factors listed previously that the tube should be flexible and the flexibility should ideally approach the flexibility of a normal vessel, investigation of the possibilities of such flexible materials continues. Such flexible prostheses may be of two general types. First, are those in which the prosthesis is sutured to the blood vessel by customary methods of arterial anastomosis. The second type is that in which the prosthesis itself is flexible, but in which the anastomosis is effected through the use of multiple-point fixation by having a rigid end to the prosthesis.

This study comprises a survey of the method of using cloth-type prostheses. The materials used have included Vinyon, Nylon, Orlon, and Dacron, both treated and untreated. Types of material were selected on the basis of adequate flexibility, regularity of the fiber, relative water repellency, and the type of weave. Material was sought of such character that it would not leak excessively when implanted. These experiments have been carried out over the past two years.

Of the materials tested to date, Orlon seems to combine the properties of lack of clotting, permanent patency with ease of handling, and lack of bleeding. In addition, the Orlon strands are extremely uniform and smooth, and it is quite nonreactive in tissue. A 75 by 100 or 100 by 100 weave of Type-81 Orlon fiber has been used in these experiments. With many types of Nylon, clotting has been a major detriment. Some types, such as forms of Nylon taffeta, have been quite satisfactory.

Following the successful use of these grafts in animals over the last year, fifteen such grafts have been implanted in patients. These have been utilized primarily for resections of aneurysms of the aortic bifurcation and for aortic bifurcation occlusions. There have been no failures in this group and no complications due to the graft. All have maintained adequate peripheral pulses and these grafts have now been in place for approximately 10 months.

The advantages of such a readily available graft substitute are quite apparent. The ability to sterilize this material by autoclaving offers

additional advantages and assures a ready supply of such grafts for every need. These grafts, however, are not recommended to bridge major flexion creases.

These grafts have been used in patients with aortic aneurysms, aortic occlusions, traumatic and arteriosclerotic occlusions of the superficial and common femoral arteries below the inguinal ligament, and, in one case, of trauma to the brachial artery with destruction of considerable collateral, so that loss of the arm appeared imminent. Circulation was completely restored in these instances and has been maintained over a period of 16 months. It appears probable from pilot studies that, by changing the type of weave from the standard weave which has been used in this type of material to date, it will be possible to obtain seamless tubes, both as straight and bifurcated, or branched tubes with considerable elastic recoil by using a diagonal-type weave, thus greatly improving the resiliency and adaptability of the grafts.

Obtainable straight-weave seamless tubes have already been utilized but have not been found to be greatly superior to tubes constructed with a single seam.

Rigid prostheses have been extremely useful in certain locations and the work presented outlines the conditions under which they may be employed. When rigid prostheses are utilized, the application of the principle of multiple-point fixation is valuable. The use of cloth-type prostheses offers a valuable adjunct to the problem of major arterial reconstruction. An Orlon-type cloth has been described which has given highly satisfactory results, both experimentally and clinically. There have also been combined the use of intubation principles with the use of flexible cloth-type tubes, that is, using multiple-point fixation to place the cloth-type prosthesis. This is done by inserting a V-type ring under the turned back edge and fixing it with a nylon ring in the usual fashion. Further results of this work will be reported elsewhere.

Fifteen cases are noted in which highly satisfactory clinical results have been obtained over a period of 16 months. (Hufnagel, C. A., The Use of Rigid and Flexible Plastic Prostheses for Arterial Replacement, Surgery, 37: 165-174, Feb., 1955)

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Change of Address

Please forward requests for change of address for the News Letter to: Commanding Officer, U.S. Naval Medical School, National Naval Medical Center, Bethesda 14, Md., giving full name, rank, corps, and old and new addresses.

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Blood Vessel Grafts in Chronic Occlusive Disease in the Femoral Artery

The obstructing lesions of chronic arteriosclerotic arterial insufficiency of the lower extremity may be isolated and discrete and appear in certain characteristic locations such as the lower abdominal aorta, the iliac arteries, and lower third of the superficial femoral artery. This circumstance makes it possible to treat certain cases of chronic arterial insufficiency by surgical restoration of vessel continuity.

Arteriosclerotic obstruction is far more common in the femoral artery than in the more proximal arteries in the pelvis and abdomen, and the incidence of technical problems and failure is greater in operations on the smaller femoral artery than on the iliac artery or aorta according to experience at the Massachusetts General Hospital. For these reasons, only occlusive disease in the femoral and popliteal arteries is considered in this report.

All patients, entering the surgical wards of the Massachusetts General Hospital with complaints referable to chronic arterial insufficiency of the lower extremity, were screened and arteriography was performed if obstruction above the popliteal artery was suggested by an absent popliteal pulse. Patients were considered possible candidates for grafting if arteriography showed a segmental obstruction technically feasible to bypass. A patent major artery of adequate caliber below the block and above the popliteal bifurcation was the chief requirement. Extensive occlusive disease in the proximal superficial femoral artery did not constitute a contraindication to graft because it has been possible to handle complete occlusion of this artery by proximal endarterectomy at its origin or by end-to-side anastomosis with the parent artery.

About one-quarter of the patients with a clinical diagnosis of femoral artery occlusion proved on arteriography to have a segmental femoral artery block, and slightly more than one-half of these were grafted.

Cases were divided into two main groups according to the degree of ischemia present, the first group including those with intermittent claudication and adequate circulation at rest; the second group including those with severe ischemia threatening amputation by virtue of ischemic lesions or unbearable pain. These two groups differed in their indication for operation.

Arterial graft was recommended in the first group if the claudication was truly disabling and if there were not associated diseases making the risk of elective surgery too great. Angina pectoris was considered a contraindication primarily because it limited the increase in ambulation potentially available from operation. A healed, asymptomatic myocardial infarct was not considered a contraindication.

All patients in the second group with an operable segmental block were recommended for arterial graft. Inasmuch as arterial graft is performed as an alternative to amputation in these patients, an operative risk, considerably greater than in the first group, is acceptable.

Twenty-two extremities of twenty-one patients were operated on in this series. Eight patients were in the first group and had an average age of 51. Thirteen patients were in the second group and had an average age of 63, with six patients in their seventies.

The authors believe that greater success can be expected from arterial homografts than from venous autografts. The high failure rate with autografts reported may be due, in part, to technical inexperience because most of these operations were performed early in the series before an artery bank was available. However, Julian and associates reported failure in 7 of nineteen venous autografts in arteriosclerotic femoral arteries, and Fontaine and co-workers had failure in over one-half of forty venous autografts. It has been apparent at the time of surgery that the flow through a long saphenous vein graft is strikingly less than that through an arterial homograft of equal length in the same patient. In this observation, lies an important reason for the inferior performance of the vein grafts.

The immediate results of successful arterial grafts have been extremely gratifying from the viewpoint of both patient and surgeon in cases of intermittent claudication and in cases of ischemic lesions. The ultimate worth of the procedure depends on the late thrombosis rate.

A considerable degree of occlusive disease in the smaller arteries of the low leg is consistent with a successful graft because, in general, occlusion in this region is well compensated by collateral circulation. Thus, in the present series, over 60% of the patients with successful grafts showed evidence of occlusion of arteries below the popliteal bifurcation in the operated leg by the postoperative absence of one or both pedal pulses. Occlusive disease in the popliteal outflow can be so extensive that flow through the graft is not sufficient to maintain patency. An estimate of the degree of distal disease allowable may be gained by comparison of illustrations of the lower leg vessels in two cases in this series, one successful in spite of obstruction in all the major lower leg vessels, and the other a failure because of thrombosis, presumably due to poor popliteal outflow.

Twenty-two extremities with segmental femoral artery obstruction were treated by blood vessel graft. Operation was successful in sixteen extremities with resulting relief of intermittent claudication and healing of ischemic lesions. The incidence of success was decidedly greater with arterial homografts than with venous autografts. Late thrombosis was observed in one of eleven successful arterial homografts and one of five successful venous autografts. The indications for, techniques of, and

sequelae following this surgery are described. (Shaw, R. S., Wheelock, F., Blood Vessel Grafts in the Treatment of Chronic Occlusive Disease in the Femoral Artery, Surgery: 37:94-104, Jan., 1955)

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End Results of Knee-Ligament Surgery

Many years of experience in the treatment of major injuries to ligaments of the knee have led to the conviction that the best outcome can only be obtained by early meticulous surgical repair of every damaged ligament. Cases illustrating the excellent results which may be obtained by early surgery have already been reported. In that report, an urgent plea was made for the early suture of injured cruciate ligaments in particular. There had been considerable controversy concerning the necessity for this. Many had said that, provided the lateral ligaments were intact and provided that the quadriceps was completely rehabilitated, cruciate ligament stability was not essential for a "normally functioning knee."

The material previously presented, in support of the claim that early suture of injured cruciate ligaments is necessary, included some 25 cases, all but two of them in athletes. Most of these men had a single type of injury--laceration of the medial collateral and anterior cruciate ligaments and of the medial meniscus. The injury was termed the "unhappy triad." While that series definitely showed that early repair was successful and that failure to repair the anterior cruciate ligament was disastrous, few statistical data were presented to confirm or to refute these impressions.

All available cases of major operations on ligaments of the knee done in the author's private practice during the 15 years, 1938 to 1953, are presented. Every effort has been made to include all cases. Eighty-two patients were reviewed for type of injury. Eighty of these had an adequate follow-up; these were used for the analysis of end results.

The exact type of operation used is of relatively little importance for the purposes of this report. It is assumed that the same careful technique has been followed in the reconstruction operations as that which has been used in repair. The procedure of early repair was described in detail in the previous report.

The method of follow-up is important because there seems to be no good substitute for personal objective examination by the surgeon. Of the eighty patients available, the author was able to see 42 (53%) for personal examination during a two-month period. Another nine patients (11%) had sufficiently detailed records to provide the necessary specific information sought. Twenty-nine patients (36%) responded by returning a questionnaire. Thus, 89% have had a recent detailed analysis especially made for the report.

The average follow-up period was 3 and 1/3 years, ranging from 6 months to 15 years. Many of the patients with a short follow-up record had excellent results when last seen. Although the author understands that they continue to do well, and to play football, their follow-up period has been listed as of the time of the last complete examination.

The number of operations done each year has steadily increased. Only an occasional operation was done prior to 1946, in which year three operations were done. With increasing confidence, and with a better understanding of the indications for operation, the number of patients operated upon increased each year, reaching a total of 18 in 1953. Most of the patients, operated upon in 1953, are not included in this survey because of the short period of follow-up.

The age incidence at the time of injury presents some interesting aspects. More cases of injury would be expected in the active years of life; this is confirmed by the fact that 80% of the patients were under 25 years of age. The authors were hardly prepared for the finding that 55% of the patients were under 20 years of age.

The author is convinced that early repair is a sine qua non for consistently good results. He has, therefore, arbitrarily divided the patients in this series according to the time elapsed between the time of injury and the time of surgery. Believing that primary healing should occur in about 2 weeks and that scar retraction should be complete in 3 months, the patients were grouped in three categories: early, comprising those operated upon within 2 weeks of the time of injury; late, those operated upon between 2 weeks and 3 months; and reconstruction, those operated upon 3 months after the injury. Minor variations would occur if the time periods were altered, but no significant change in the pattern would result. Slightly more than one-half of the patients are included in the early group (55%). All of the patients might well have been divided into two groups only, early repair and late repair--a division which would show even more dramatically the advantage of early repair.

Classification of the patients according to the type of injury presented some difficulty, because so many different combinations of injuries to the ligaments are possible. The most common pattern is that of some combination of injury to the medial collateral ligament, the medial miniscus, and the anterior cruciate ligament. Actually, 69 of 82 patients (84%) had injuries to the structures of the medial side; only 6 patients (7.5%) had injuries to structures of the lateral side; and 7 patients (8.5%) had injuries to the cruciate ligaments alone.

Most significant is the fact that in 62 patients (75% of the 82 operated upon), one or both of the cruciate ligaments were torn, the anterior cruciate being torn in all but 4 patients in this group. This points out the fact that anterior-cruciate deficiency has been a primary factor in the indications for surgical repair.

An attempt is made to summarize the end results. The significant fact is the uniform grouping of the patients in the early group at a consistently higher level of recovery. The number of good results in all cases with cruciate injury rapidly diminishes as the time between injury and surgery increases. The severity of the injury is relatively unimportant if the injury is repaired early.

Cruciate-ligament instability at the knee causes a definite disability and should be prevented if possible. Repair of the cruciate ligaments is surgically feasible and highly successful if it is done early.

Cruciate-ligament instability was the primary cause of disability in those athletes who did not return to competition. Of the 16 athletes who did not return to full competition, 15 (94%) gave cruciate instability as a major cause of their failure to participate. They could tolerate some pain, some stiffness, some weakness, some lateral instability, but they could not tolerate cruciate instability.

The time of the repair is vastly more important than the severity of the injury, but the more serious the injury is, the more urgent is early repair. Results in the athletes were markedly better than those in non-athletes, regardless of age. Complete rupture of any ligament of the knee demands early surgical repair to assure best results. In all types of injury, early repair (under 2 weeks) gives much better results than late repair or reconstruction. (O'Donoghue, D. H., An Analysis of End Results of Surgical Treatment of Major Injuries to the Ligaments of the Knee, J. Bone & Joint Surg., 37-A: 1-12, Jan., 1955)

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Multiple Intracranial Arterial Aneurysms

Although not considered common, multiple intracranial arterial aneurysms occur with sufficient frequency to preclude the possibility that they represent merely rare coincidental abnormalities. Dandy estimated that approximately 15% of cases of intracranial aneurysms were multiple, and Hamby gave some consideration to their clinical and pathologic significance. Otherwise, little more than casual notice has been made of them except as occasional case reports and incidental findings in statistical analyses. Even the exhaustive tabulation of intracranial aneurysms, compiled by McDonald and Korb, is generally limited to a listing of one, when multiple aneurysms were present. If there was rupture of one of them, it was the one listed. Hence, an analysis and review of intracranial aneurysms, in terms of the significance of their multiplicity, appears timely.

In most reports of the early 19th century, the descriptions are clear and precise and obviously describe as intracranial aneurysms the same

lesions that are generally recognized and accepted as true aneurysms today, especially in terms of location, size, and shape. Usually these arterial protuberances have been located on the major arteries at the base of the brain, including the vertebral and basilar arteries, the internal carotid arteries, and the Circle of Willis and its branching cerebral vessels. In general, such aneurysms range from a diameter of about 0.2 cm. up to 1.5 cm., although smaller, and occasionally much larger aneurysms were found. The woodcuts in some of the older literature illustrate these lesions admirably.

The incidence of additional intracranial aneurysms is difficult to determine. Many reports fail to mention whether any of the cases had multiple lesions. Other reports, however, clearly specify or indicate the percentage of multiple aneurysms present. A compilation from this latter group, including all reports with two or more cases, has been made. In any event, from a total of 2237 cases of intracranial aneurysm, 228 (slightly over 10%) were of multiple lesions.

One impression gained from reviewing the literature indicates that multiple aneurysms occur more frequently than they are found or reported. Undoubtedly, the finding of a large ruptured aneurysm often terminates an examination of the arterial tree unless an obvious second aneurysm is close by. Only a diligent search, usually made with the possibility of other aneurysms in mind, will disclose their presence.

With the advent of angiography, roentgenographic demonstration of multiple aneurysms has frequently been made, and the desirability and advisability of bilateral carotid angiography has frequently been advocated in order to ascertain their presence. Before the advent of angiography, only a few instances of multiple aneurysms were recognized in x-ray films of the skull by means of abnormal calcification in the aneurysms. Scott, on the basis of rather bizarre neurologic findings, suggested a clinical diagnosis of multiple intracranial aneurysms.

The immediate prognosis and eventual outcome of patients with multiple aneurysms is also of interest. As mentioned, only rarely do two of these lesions rupture simultaneously. However, several reports mention the leakage or rupture of a second aneurysm at some period subsequent to bleeding from an earlier one. Such a situation can only occur if a person recovers from the effects of a first aneurysm. However, if there is initial survival, either with or without surgical intervention, the possibility that a second aneurysm might become symptomatic needs to be kept in mind, especially if its presence has been clinically demonstrated. In passing, it is to be noted that there are a number of reports in which it was believed that a leaking aneurysm, which had temporarily healed, gave rise to a second episode of bleeding a number of years later.

Recurrent episodes of aneurysmal bleeding usually occur within a short time after the first one. Hence, it is not only possible, but probable,

that hemorrhage, which occurs some years after a first episode, represents leakage from a second aneurysm rather than a recurrence of bleeding from the first.

Three lesions have been found, in association with intracranial aneurysms, sufficiently often to be noteworthy: (1) anomalies of the Circle of Willis; (2) coarctation of the aorta; and (3) congenital polycystic renal disease.

The etiology of intracranial aneurysms has been the subject of many reports and reviews; therefore, a detailed historical recapitulation seems superfluous. Comment is pertinent, however, on the significance of possible causative factors which may be applicable to the etiology of multiple aneurysms. Clearly, mycotic aneurysms, which are dealt with separately, can be set apart as a group because their etiology and pathogenesis depend primarily on the effects of infectious agents which are extrinsic to the affected artery. Syphilis, which is also considered separately, is of little etiologic significance and would not be of much importance even if all dubious instances of syphilitic aneurysms were accepted without reservation.

One of the most complex and difficult aspects of the problem of etiology centers on the relative importance of arteriosclerosis, on the one hand, and congenital or developmental defect in the arterial wall, on the other, as the fundamental basis for aneurysm formation. Differences of opinion exist even with regard to the differentiation of arteriosclerotic from berry or "congenital" aneurysms. Furthermore, even when an aneurysm is conceded to be of the "congenital" type, there are differences of opinion as to the nature of the vascular defect which results in the development of the aneurysm. Even the criteria for distinguishing arteriosclerotic from "congenital" aneurysms are not clear. Thus, it is hardly helpful to designate aneurysms as arteriosclerotic or congenital, or of other etiology for that matter, simply on the basis of opinions given by individual authors, which often can not be substantiated. (Bigelow, N. H., Multiple Intracranial Arterial Aneurysms, Arch. Neurol. & Psychiat: 73: 76-99, Jan., 1955)

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Radical Hysterectomy and Pelvic Lymphadenectomy

The purpose of this study was twofold: (1) to analyze certain clinical aspects of patients suffering from cancer of the uterus or vagina who had radical hysterectomy with pelvic lymphadenectomy, and (2) to review the result of surgical treatment of carcinoma of the cervix.

The material is based upon a series of 473 cases of radical hysterectomy with pelvic lymphadenectomy, performed by the staffs of the Vincent

Memorial Hospital, the Massachusetts General Hospital, the Pondville Hospital, and the Palmer Memorial Hospital during a period of almost 15 years. Both clinic and private patients were included. The operative procedure was that described by Meigs. In cases of carcinoma of the cervical stump or carcinoma of the vagina after a previous total hysterectomy, the procedure was similar, with the radical removal of the broad ligament, paracervical and paravaginal tissue, and pelvic lymph nodes. In cases of carcinoma of the cervix, the clinical extent of the tumor was grouped according to the International Classification.

The data is presented in two parts: (1) general information on patients who had radical hysterectomy with pelvic lymphadenectomy, and (2) radical hysterectomy with pelvic lymphadenectomy as a treatment for carcinoma of the cervix.

Originally, the radical hysterectomy with regional lymphadenectomy in the clinics under study, was restricted to a carefully selected group of patients in order to achieve a minimal operative mortality. This policy was dictated by the established position of radiotherapy. A high primary mortality at that time would have precluded further development of surgical treatment for cancer of the uterus. After nearly a decade of experience, it was evident that the risk of operation was low and the procedure effective. Accordingly, it was possible to extend the indications for radical operation so that more advanced cases and less robust patients were accepted in recent years. The low operative mortality in this series (1.7%) is considered to be the result of improvement in the care of surgical patients. It is also noted that there was only one operative death among 344 operations for primary cancer of the cervix.

Radical hysterectomy, with pelvic lymphadenectomy, is essentially a procedure for cancer of the cervix. Some cases of carcinoma in situ in this series were originally diagnosed histologically as being invasive cancer. A review of the histological sections after the operation has placed them in the present category. Surgeons are now more conservative and require unequivocal histologic evidence of invasion before applying the radical procedure. Carcinoma in situ is now treated with total hysterectomy with wide vaginal cuff resection.

Fistula formation is the bete noire of radical hysterectomy. In 9% of the cases in this study, a fistula developed. Of the 45 fistulas, 35 (78%) involved the ureter. A satisfactory solution to this distressing problem has not been found. Fistula formation occurred approximately as frequently in 1953 as it did in 1939. Apparently, whatever improvement in technique was achieved had been offset by the progressive widening of the scope and radicality of the procedure. Undoubtedly, adjacent tumor at times forces the removal of critical tissue.

The influence of preoperative radiotherapy on the development of fistulas is difficult to assess; 15 (33%) of the 45 patients in whom a fistula

developed had received preoperative irradiation as compared with 29% of the entire group. Although it is not reflected in the statistics, the patients who have fistulas after having received preoperative irradiation, have a more difficult course, if one may judge by the 9 patients in this study who had multiple fistulas, all of whom had had radiotherapy before the operation.

When a ureteral fistula develops, the patient will almost certainly lose the function of the involved kidney unless surgical intervention is taken. In only 8 patients out of 35 in this study was the kidney function preserved, and of these, 6 had operative reimplantation into the bladder and one was saved by repeated ureteral dilatation. The technical difficulties of early operation are to be balanced against the inevitable damage of infection and obstruction. Operation should, therefore, be undertaken, if possible, within three to six weeks. If the gap between the viable ureter and bladder is excessive, it can at times be bridged by a tube constructed from the bladder dome. If even this will not suffice, the ureter may be implanted in the adjacent large bowel.

Inevitably, there will be some patients in whom tumor tissue has not been completely extirpated. Of the 5 patients in this study in whom this occurred, with tumor tissue remaining deep in the pelvis, 4 have died despite subsequent radiotherapy. The fifth patient is alive and well at five years.

Residual malignancy in the vagina is more easily recognized both in the surgical specimen and by subsequent vaginal smears. It is also much easier to eradicate by excision of more vaginal tissue. Among the 13 patients who had incomplete removal of tumor from the vaginal cuff, 8 had subsequent total vaginectomy and 5 had no additional treatment. Of the 8 excised vaginal specimens, 3 showed the presence of invasive carcinoma, 2 carcinoma in situ, and the remaining 3 showed no demonstrable lesion. Failure to reoperate upon the patients when there is residual tumor at the vaginal cuff is serious in view of the fact that 3 deaths out of the 5 occurred in a brief period of time.

The incidence of metastasis to pelvic lymph nodes is remarkably constant in cancer of the cervix and the corpus. In carcinoma of the corpus, both the anatomical location of the tumor and the myometrial invasion by the cancer have great importance in lymph node metastasis. Among the patients with lesions confined to the corpus, 12% had lymph node metastasis but when the lesions involved both corpus and cervix, 50% of the patients had lymph node metastasis. It was also found that lymph node metastasis was present in 4% of the patients with corpus carcinoma limited to the endometrium in contrast to 45% of the patients whose corpus cancer invaded the myometrium. The frequent lymph node metastasis in carcinoma of the corpus is somewhat surprising in view of the fact that comparatively favorable result has been achieved by simple hysterectomy alone.

The spread of benign and malignant endometrium to pelvic lymph nodes and to the ovaries affords interesting comparison. Among the 34 cases of pelvic endometriosis, 19, or 56%, showed endometriosis in the ovaries, and 5, or 15%, showed endometriosis in the pelvic lymph nodes. In the 47 cases of corpus carcinoma, ovarian metastasis occurred in 4, or a 9% incidence, and lymph node metastasis in 11, or a 23% incidence. This is at some variance with Javert's finding in a larger series of cases. His data showed close parallelism between lymph node involvement of endometriosis and that of corpus carcinoma (29% and 28%, respectively). In addition, he found that in the case of corpus carcinoma, the incidence of metastasis to lymph nodes is twice as high as to the ovaries.

The lymph nodes most commonly involved are the obturator, the common iliac, and the external iliac, with the last a poor third. All of the remaining pelvic nodes are occasionally involved, so that they cannot be ignored. The obturator nodes mentioned lie at the bifurcation of the common iliac vessels between the external and internal iliacs. and adjacent to the obturator nerve.

The effect of preoperative irradiation on the incidence of lymph node metastasis in carcinoma of the cervix is inconclusive. The data showed that lymph node metastasis was present in 28% of the patients who had received preoperative irradiation, and in 25% of the patients who received no irradiation before the operation.

The entire series of 473 cases included 294 cases of primary squamous-cell carcinoma of the cervix, 27 primary adenocarcinoma of the cervix, one case of leiomyosarcoma of the cervix, 23 cases of carcinoma of the cervical stump, 47 primary carcinoma of the corpus, 5 primary carcinoma of the vagina, 21 recurrent or residual carcinoma of the uterus (18 were squamous-cell carcinoma of the cervix and 3 were adenocarcinoma of the corpus), 34 carcinoma in situ of the cervix, and 21 referred cases in which cancer was found in the preliminary biopsy but there was no malignancy in surgical specimen. (Liu, W., Meigs, J.V., Radical Hysterectomy and Pelvic Lymphadenectomy: Am. J. Obst. & Gynec.: 69: 1-32: Jan., 1955)

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Unexpected Death in Asthma

The prognosis in asthma, so far as duration of life is concerned, is generally considered to be good and it is a fact that the majority of asthmatic patients, although they may have to live restricted lives, learn to compensate for their disability and may even accomplish a great amount of useful work. In the usual course of events, emphysema is likely to supervene, and death most commonly occurs from congestive

heart failure or from respiratory infection. It is customary to console the asthmatic patient with the assurance that the duration of life is not likely to be affected, and this optimistic view is commonly justified in the event.

Occurrence of a fatal result in status asthmaticus does not come as a surprise or shock to the relatives or to the doctor, because the patient is gravely and increasingly ill over a period of hours or days. During the past few years, however, it has become apparent to the writer that there is a small number of asthmatic patients who die quite suddenly in an attack which does not differ in any respect from the attacks of asthma to which these patients are accustomed. This condition is completely different from that which is termed status asthmaticus. It is essential to realize the possibility of such an event, for unexpected death in what appears to be a perfectly innocent condition, is liable to come as a great shock to the relatives, particularly if they have been assured that asthma is not a fatal complaint. From the scientific point of view, it is necessary for the fact to be placed on record that spasmodic asthma, in itself, is a possible cause of death. Unless this fact is recognized, the medical attendant may be tempted to postulate some additional condition which is known to cause sudden death, such as coronary thrombosis, in order to explain the occurrence, but there is no evidence which would suggest that asthmatic subjects are prone to develop coronary disease, and the mode of death in patients described in the article did not suggest coronary thrombosis or, in fact, sudden heart failure. The clinical picture in each case was that of sudden failure of respiration, for which no plausible explanation can be advanced.

The present series consists of a group of 9 cases which have been under observation and treatment during the past 10 years. Consideration of this group shows some common factors which may be significant. In the first place, the age of onset was confined to patients over 35 years of age, and it is noteworthy that no fewer than 6 died suddenly within 2 years of the onset of asthma. There was little evidence of an allergic factor; the upper respiratory tract was significantly diseased in 6 patients. Careful examination revealed organic change in the lungs in only one patient.

The heart was examined clinically, radiologically, and by the electrocardiogram in each case. In none of these cases, however, could there be any suggestion of heart strain leading to sudden death, and the state of the circulation was about the same as one would expect to find in any similar group of adults. The most significant feature was that a distinct "psychological" factor was considered to be present in every case; it is necessary to be very careful in assessing the significance of a psychological factor in any asthmatic patient unless a full investigation has been carried out in order to determine which other factors are present. An interesting point emerges from a review of this group. If one considers a large group of asthmatic patients, the most striking feature as a rule

is the cheerfulness with which the patient faces his disability. In the majority of cases the patient makes light of the moderate attack of asthma and carries on with his work in a way which might seem inexplicable to a non-asthmatic person. Each of these 9 patients reacted differently. In all there was a defeatist attitude almost from the start, and 7 patients expressed a conviction of impending death. This unusual attitude appears to be significant and makes one wonder if the mechanism by which life ceases is, as yet, fully understood. In 4 of the cases described, death occurred in the presence of a qualified observer. In each case the event was sudden and completely unexpected, within a few minutes of the onset of what appeared to be an average attack of asthma, and the only apparent explanation in each instance was a sudden failure of respiration. It may also be significant that 8 of these patients died at home; possibly the feeling of security, conveyed by a hospital and an ever-present nursing staff, is an important factor in guarding the patient against an event of this sort. The prevalent feeling in every case was a complete loss of confidence in the future and an entirely hopeless attitude toward life. Consideration of the observations, presented in this article, leads to the conclusion that an asthmatic patient who exhibits a pessimistic attitude should be regarded with some suspicion, and the prognosis in such cases should be carefully framed in order to forewarn the relatives that sudden death is a possibility.

It is difficult to see what measures can be taken to support this particular type of patient. Naturally, all the usual methods of treatment will be given in the ordinary way, but the results of standard treatment in this series were unsatisfactory. In some ways there was a resemblance to a depressive psychosis, and it might be worth while considering some such treatment as electro-convulsant therapy in the depressed asthmatic. The treatment of the acute emergency depends upon the adoption of instant measures and it is unlikely, therefore, that the opportunity for immediate therapy will often arise. Adrenalin does not appear to be of the slightest value but, if available, the most suitable method from the pharmacological point of view would be the injection of 5 to 7 mils. of nikethamide into a vein.

Death may occur quite suddenly in an attack of asthma. Patients who appear to be liable to this disaster are those who develop asthma after the age of 35 years, and in particular, those who exhibit a depressive tendency. When present, this tendency should be treated. (Maxwell, J., Unexpected Death in Asthma: Dis. Chest, 27: 208-212, Feb., 1955)

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The printing of this publication has been approved by the Director of the Bureau of the Budget, June 23, 1952.

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Treatment of Hypertension with Reserpine

Extracts of Rauwolfia serpentina have been extensively used in India for several decades in the treatment of a variety of conditions including hypertension. Their value in treatment of the latter condition has recently attracted world-wide interest. The particular activity as a hypotensive agent of reserpine, an alkaloid of Rauwolfia isolated by Swiss workers, has been investigated in animals by Bein and associates, by Trapold and co-workers, Plummer and colleagues, and McQueen and associates.

This report presents the results of using reserpine alone in tolerable doses in 40 cases, reserpine in combination with pentapyrrolidinium in 66 cases, with hexamethonium in 9 cases, and in combination with alkaloids of veratrum in 10 cases.

The object in treating hypertensive patients is to reduce the blood pressure to as near normal as possible, for as much of the 24-hour day as can be achieved, and the assessment of the therapeutic value of hypotensive drugs is an assessment of the degree of safe blood pressure reduction which can be attained without intolerable side effects. The authors have used these criteria in examining the efficacy of reserpine, alone and in combination with pentapyrrolidinium and with veratrum alkaloids.

Reserpine alone sometimes produces large blood pressure falls, but usually only in doses which are accompanied by severe side effects. When smaller doses are used, the side effects are generally less conspicuous, but with such doses, the authors have been able to obtain an adequate hypotensive action in only one-fourth of their patients. Those in whom an adequate control could be achieved by the use of reserpine alone were generally the milder cases, and often though not invariably, they had low basal blood pressures. Even with the low doses used, they encountered some difficulties from side effects, particularly in the aggravation of symptoms in subjects with bronchial asthma, ulcerative colitis, gallstones and pre-existing mental depression. Further, they found that, in patients with hypertensive heart failure, blood pressure reduction by reserpine does not improve breathlessness as with a corresponding reduction by pentapyrrolidinium.

The authors examined the effects of combining reserpine with various preparations of veratrum. Their particular interest was to determine whether the addition of reserpine enabled a greater degree of blood pressure reduction to be obtained without the development of vomiting or other side effects of veratrum. The results have been disappointing. In 10 patients, the addition of reserpine did not alter the dose of veratrum which led to vomiting, and subtoxic doses of veratrum were not found to exert any distinctively greater hypotensive effect after the addition of reserpine

than they did before. The authors concluded that the combination of reserpine with veratrum is not a satisfactory means of treating hypertension.

The combination of reserpine with pentapyrrolidinium was also studied. Pentapyrrolidinium is a substance chemically related to hexamethonium, but, unlike hexamethonium, it can be safely and effectively given by mouth in most patients. It shares with hexamethonium the disadvantage that blockade of the sympathetic ganglia, sufficient to induce a useful blood pressure fall, cannot usually be obtained without parasympathetic ganglionic blockade also occurring. Although the hypotensive action of pentapyrrolidinium is more prolonged than that of hexamethonium, the blood pressure usually rises to hypertensive levels by the time that the next dose is due to be taken. The authors examined the result of combining reserpine with pentapyrrolidinium with special reference to the incidence of parasympathetic side effects, and also to determine whether the combination of drugs gave a more consistent and smooth hypotensive effect. The results of combining the two drugs gave a more consistent and smooth hypotensive effect. The results of combining the two drugs were encouraging. In 53 out of 69 patients, in whom the combination was examined, it was possible to produce a better control over the blood pressure with fewer side effects. In those, previously taking pentapyrrolidinium alone, the addition of reserpine made it necessary to reduce the dose of pentapyrrolidinium. In some instances, the dose of pentapyrrolidinium required was less than half that previously needed. The greater reduction in dose of pentapyrrolidinium, the greater was the reduction of side effects due to parasympathetic blockade. In a few patients, it had been difficult to maintain fully effective hypotensive therapy with pentapyrrolidinium alone because of the severity of the side effects, and in these patients, a striking improvement in the degree of control was usually obtained by the combination with reserpine.

Over the past four and one-half years, the authors have studied the therapeutic value of the methonium compounds, the veratrum alkaloids, 1-hydrazinophthalizine (Apresoline), the hydrogenated ergot alkaloids, the adrenolytic agents such as dibenzyline and reserpine. Of these, the combination of reserpine and pentapyrrolidinium appears to be distinctively the most effective means of controlling the blood pressure. (Doyle, A. E., McQueen, E. G., Smirk, F. H., Treatment of Hypertension with Reserpine in Combination with Veratrum Alkaloids, Circulation, 11:170-181, Feb., 1955)

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Course in Aviation Medicine

The Bureau of Medicine and Surgery announces a class in Aviation Medicine which will convene at the U. S. Naval School of Aviation Medicine,

Naval Air Station, Pensacola, Florida, on 4 April 1955. The course consists of approximately 6 months of academic instruction in aviation medicine and flight indoctrination training, and leads to the designation of successful candidates as U. S. Naval Flight Surgeons.

The class will be limited to 30 students and is open to medical officers of the Regular Navy and Naval Reserves in the ranks of Lieutenant Commander and below. Subsequent classes will be convened approximately every 3 months, and acceptable candidates whose applications have been received after the 4 April class quota has been filled shall be enrolled in the next convening class.

Medical officers who wish to apply for the course in Aviation Medicine should do so by an official request via the chain of command to the Chief of the Bureau of Medicine and Surgery which shall contain this service agreement, "If this request is approved, I agree to remain on active duty for one (1) year upon completion of the course in Aviation Medicine, or for six (6) months beyond my currently obligated service, whichever is longer." (AvMedDiv, BuMed)

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Correspondence Training Courses

The Medical Department Correspondence Courses listed below are available and recommended for use by officer and enlisted personnel (as indicated in column 4) of the regular Navy and Naval Reserve. Texts and materials needed to complete the assignment are furnished enrollee.

Applications shall be forwarded as follows:

(a) If on active duty, wherever stationed, via your commanding officer.

(b) If not on active duty, but a member of, or associated with a Reserve pay unit, forward via the unit commander and such other official channels as may be locally prescribed. If a member of, or officially attached to, a pay unit under the cognizance of the Chief of Naval Air Reserve Training, forward also through that command at Glenview, Ill.

(c) If not on active duty, and not a member of, or associated with, a pay unit, forward via the district commandant. If a member of a non-pay unit under the cognizance of the Chief of Naval Air Reserve Training, forward via that command instead of through the district commandant.

(d) If not on active duty and residing outside the United States, forward applications for unclassified courses to the appropriate administering activity via (1) the local naval, military, or diplomatic representative of the United States if there be such representative, and (2) the naval command holding the service record of the applicant.

(e) Requests for enrollment by all medical personnel other than dental personnel should be addressed to the Commanding Officer, U. S. Naval Medical School, National Naval Medical Center, Bethesda 14, Maryland. Use form NavPers 992, changing the "To" line appropriately. These forms can be obtained from commanding officers, district commandants, or most naval commands overseas.

Satisfactory completion of an authorized correspondence course will earn a certain number of promotion points and the same number of retirement points if the enrollee is eligible to receive both. Credit will be granted only once for each course unless the Chief of Naval Personnel specifically designates the course as one that may be retaken for additional credit. Courses are so designated only when they have been extensively revised, and it is deemed desirable that officers study the subject again.

The Reserve Officer Promotion Recording Activity (ROPRA) in Omaha, maintains a record for each officer of the Naval Reserve. In this record are entered all the promotion points and retirement points earned by the officer. Correspondence course points are credited as follows:

(a) If a course carries 12 points or less credit, the points are credited upon satisfactory completion of the entire course.

(b) If a course carries more than 12 points credit, the points are credited upon completion of each 12-point unit and the final unit of the course.

(c) In either case the date of completion of the course, or of a course unit, is the date the last assignment of the course or course unit is deposited in the mails by the enrollee.

Only one course may be taken at a time. This, however, may not interfere with courses given by other activities.

Additional information on Naval Medical Department Correspondence Courses may be obtained from Naval District Commandants, Catalog of officers correspondence course (NavPers 10800-A) of September 1954, and from this Command.

Q-NO	Description Medical Department Specialty Courses	NavPers Number	Available To	Assign-ments	Retirement Points
Q-1	Medical Department Orientation	10943	O & E	6	12
Q-3	Functions of Officers of The Medical Department	none	O	7	12
Q-11	Naval Preventive Medicine #(1954 Revision)	10703	O	12	24
Q-12	Insect, Pest and Rodent Control @(1954 Revision)	10705	O & E	8	18
Q-14	Combat and Field Medicine Practice #(1954 Revision)	10706	O	8	24
Q-15	Clinical Laboratory Procedures	none	O & E	8	36
Q-16	Tropical Medicine in the Field	none	O	8	32
Q-17	Special Clinical Services (General) #(1954 Revision)	10702	O & E	8	24
Q-19	Submarine Medicine Practice #(1954 Revision)	10707	O	8	24
Q-20	Aviation Medicine Practice	10912	O	8	24
Q-21	Radiological Defense and Atomic Medicine #(1954 Revision)	10701	O	11	32
Q-22	Frigid Zone, Medical and Dental Practice	10997	O	6	12
Q-23	Pharmacy and Materia Medica	10999	O & E	8	24
Q-25	Special Clinical Service (Blood)	10998	O	8	24

O - Officer
E - Enlisted
NMSCTD-13(8-2-9-55)

#1954 Revision from Thesis to Objective type question.
@Text and question type Rev. 54

Promotion Points	*Information for Naval Reserve Officer Personnel ONLY		Classification	Type of Course
12	1 thru 6	12 pts	Unclassified	Objective
12	1 thru 7	12 pts	Unclassified	Thesis
24	1 thru 6	12 pts	Unclassified	Objective
	7 thru 12	12 pts		
18	1 thru 6	12 pts	Unclassified	Objective
	7 & 8	6 pts		
24	1 thru 4	12 pts	Unclassified	Objective
	5 thru 8	12 pts		
36	1 thru 3	12 pts	Unclassified	Thesis
	4 thru 6	12 pts		
	7 & 8	12 pts		
32	1 thru 3	12 pts	Unclassified	Thesis
	4 thru 6	12 pts		
	7 & 8	8 pts		
24	1 thru 4	12 pts	Unclassified	Objective
	5 thru 8	12 pts		
24	1 thru 4	12 pts	Unclassified	Objective
	5 thru 8	12 pts		
24	1 thru 4	12 pts	Unclassified	Objective
	5 thru 8	12 pts		
32	1 thru 4	12 pts	Unclassified	Objective
	5 thru 8	12 pts		
	9 thru 11	8 pts		
12	1 thru 6	12 pts	Unclassified	Objective
24	1 thru 4	12 pts	Unclassified	Objective
	5 thru 8	12 pts		
24	1 thru 4	12 pts	Unclassified	Objective
	5 thru 8	12 pts		

*Unit Completion letters prepared upon satisfactory completion of assignments as indicated.

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Officer Training

The professional education program for naval officers is extensive and contains many features designed to meet the changing needs of modern warfare. An officer's education continues throughout his career and reflects both his personal interests and the needs of the service.

The Navy considers its education program essential and strives to make it as effective as possible. Each school and course is designed to meet a specific objective in the minimum time. Curriculum and course changes are constantly being made to improve the quality of instruction.

The Bureau of Medicine and Surgery is responsible for the professional training of personnel of the medical, dental, medical service, and nurse corps. Medical officers are selected from graduates of approved medical schools; thus their training while in the Navy is graduate training.

The Bureau of Medicine and Surgery is assisted in the Graduate Medical Training Program by a civilian Board of Consultants, members of which represent each of the major medical specialties, as well as the American Medical Association Council on Medical Education and Hospitals. Graduate medical training consists of these general types: internship, residency training, continuation courses, and special courses.

The Medical Service Corps is made up of officers specializing in supply and administration, optometry, pharmacy, and allied sciences. Personnel of the Medical Service Corps, specializing in supply and administration, come from within the service and are given special training in the Naval Medical Center, civilian institutions, and joint schools. Medical Service Corps officers specializing in optometry, pharmacy, and allied sciences are procured directly from civilian life. Women officers are appointed to the Medical Service Corps in certain specialties.

Members of the Navy Nurse Corps are commissioned in the Navy after being selected from graduates of accredited nursing schools. The Navy provides for training of nurses leading to the baccalaureate degree in nursing or nursing education. Various courses are provided each year and nurses approved for special training become a part of the regular student body in civilian universities. Opportunities for advanced professional training of nurses are available for those who demonstrate aptitude for such training.

The Dental Corps is composed of dental officers selected from graduates of civilian dental schools. Postgraduate training for dental officers is available in naval and joint schools and in civilian colleges. The U. S. Naval Dental School, which is affiliated with the American Association of Dental Schools, provides a general postgraduate course and several specialized courses. A few officers are assigned to research training and to the dental faculty of the Naval Medical Research Institute.

All officers within the medical and dental specialty are encouraged to apply for postgraduate courses and refresher courses in subjects for which they have special skill and interest. (Rose, H. C., Fisher, D. W., Naval Training Bulletin: Dec., 1954)

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Navy Mutual Aid Association

At the annual meeting of the Board of Directors of the Navy Mutual Aid Association, 18 February, Admiral R. B. Carney was elected President. Other elected officers were RADM A. H. Van Keuren, USN, RET, First Vice President, RADM Frank Baldwin, SC, USN, RET, Second Vice President, BRIGEN T. A. Wornham, USMC, Third Vice President, and CAPT T. S. Dukeshire, SC, USN, RET, Secretary and Treasurer.

Elected to the Board of Directors were RADM R. J. Arnold, SC, USN, RADM L. A. Bachman, USN, RET, RADM H. C. Bruton, USN, RADM K. K. Cowart, USCG, RADM C. E. Ekstrom, USN, CDR P. R. Engle, MC, USN, CAPT P. H. Harrington, USN, RADM J. B. Heffernan, USN, RET BRIGEN S. S. Jack, USMC, CAPT D. C. MacKenzie, SC, USN, CAPT W. P. Mowatt., USN, CDR G. D. O'Brien, USNR, RADM J. R. Perry, CEC, USN, CAPT P. W. Pfingstag, USN, and CAPT Bernhard Tieslau, SC, USN.

RADM K. K. Cowart, USCG, was continued in office as Chairman of the Membership Committee, RADM Frank Baldwin, SC, USN, RET, as Chairman of the Finance Committee, and CDR P. R. Engle, MC, USN, as Medical Director of the Association.

As a result of recent action by the Board of Directors, the regular benefit of $7500 has been increased to $8000 through a terminal dividend of $500. This action marks the first step in a long range program to devote an increasingly large share of the earnings of the Association to an increased benefit after making ample provisions for surplus and contingency reserves.

The Association announced that, in 1954, 1309 officers were admitted to membership, an increase of 98% over the previous year. Total membership now stands at over 12,400 and assets exceed twenty-eight million dollars.

Membership in the Association is now open to all Regular commissioned and warrant officers, both permanent and temporary, of the Navy, Marine Corps and Coast Guard, and Reserve officers of these services serving on extended active duty who have one year's continuous active service or one year or more of obligated active service at time application is submitted.

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From the Note Book

1. Reserve credit points may be earned by Reserve Officers of the military medical services for attendance at the daily scientific sessions of the twenty-sixth annual meeting of the Aero Medical Association, Hotel Statler, Washington, D. C., March 21 - 23.

More than half of the meeting's 40 scientific presentations will be devoted to military aspects of aviation medicine and flying safety. A symposium on the newest developments in the field of space medicine, and a round table discussion of the aeromedical aspects of flight at extreme speed and altitude will be presented by a group of outstanding test pilots. (D. O. D.)

2. The Executive Committee of the National Board of Medical Examiners has extended an invitation to Rear Admiral B. W. Hogan, MC, USN, to serve as a member of the Board. Admiral Hogan has designated a deputy, Captain C. L. Andrews, MC, USN, Director of the Professional Division, BuMed, to serve with him as a member of the Board. (TIO, BuMed)

3. Rear Admiral I. L. V. Norman, MC, USN, assumed the duties of Assistant Chief for Personnel and Professional Operations, March 2, 1955. He relieved Rear Admiral J. Q. Owsley, MC, USN, who served in that position from June 1, 1953.

Prior to reporting to the Bureau of Medicine and Surgery for his present duty, Admiral Norman served as Commanding Officer of the U. S. Naval Hospital, Great Lakes, Ill. (TIO, BuMed)

4. Captain D. J. O'Brien, MC, USNR, relieved Captain M. H. Porterfield, MC, USNR, as Director of the Naval Reserve Division, Bureau of Medicine and Surgery, on March 1, 1955. (TIO, BuMed)

5. Two awards for Navy training films entered in the International Exhibition of Cinematographic Art held annually in Venice, Italy, were recently received in the Navy Department. The award-winning films, entitled "Breathe and Live" (MN-7498A) and "Equilibration of Occlusion"(MN-7340), were produced by the Bureau of Aeronautics under the direction of the Audio-Visual Training Section, Bureau of Medicine and Surgery. (TIO, BuMed)

6. The new Naval Dental Clinic, Guam, M. I., was formally dedicated on January 12, 1955. The new clinic is a one-story, T-shaped, pre-cast, concrete building which occupies a scenic position on the high bluff overlooking Apra Harbor. It has six standard dental operating rooms, a surgical suite of two dental operating rooms with connecting sterilizing room, prosthetic suite of two dental operating rooms with an accessory office, a dental prosthetic laboratory, a dental repair shop, administrative offices,

and other ancillary spaces. The new facility is resistant to typhoons and earthquakes and is completely air conditioned. (TIO, BuMed)

7. The Council on Dental Education of the American Dental Association has given approval to the following dental educational programs being conducted at the Naval Dental School, National Naval Medical Center, Bethesda, Maryland: Residency in Oral Surgery and Residency in Periodontics. (TIO, BuMed)

8. Standard Samples and Reference Standards, issued by the National Bureau of Standards, is a circular containing a descriptive listing of the various standard samples issued by the National Bureau of Standards. A schedule of weights and fees, as well as direction for ordering, is included. Summarized tables of analyses are presented to indicate the type of standards of composition presently available. The current status of the various standards will be indicated by a mimeographed insert. (National Bureau of Standards)

9. "Stop Rheumatic Fever," a new motion picture for the public, showing how this disease can be prevented by treatment of "strep" infections, is being released for nationwide use. The animated film will be used as part of the "Stop Rheumatic Fever" campaign now being conducted by the National Heart Institute, Public Health Service; and the American Heart Association and its affiliates. (PHS, H. E. W.)

10. Sixty Navy enlisted women were treated topically with 2% neutral sodium fluoride and 88 controls with sodium chloride. There was no significant reduction in caries incidence of persons receiving a sodium fluoride solution over those receiving a placebo. (Carter, W. J., Jay, P., Shklair, I. L,, Danier, L. H., J. Dent. Res., Feb., 1955)

11. A nurse who was sightless for 5 years describes her experiences and suggests how nurses can help the blind develop independence. (Willma, I. R., Am. J. Nursing, Feb., 1955)

12. Surgical treatment will permit the social and economic rehabilitation of patients with ulcerative colitis who fail to respond to medical treatment, or in whom a complication of ulcerative colitis develops that cannot be treated medically. (Cattell, R. B., Colcock, B. P., Surgical Treatment of Ulcerative Colitis, Postgrad. Med., Feb., 1955)

13. A technique for consistently satisfactory repair of hypospadias is discussed by Byars, L. T., Surg. Gynec. & Obst., Feb., 1955)

14. A case report of a large primary malignant mesenchymoma of the liver, successfully removed, with normal liver tissue surrounding the tumor, by right hepatolobectomy, is presented. (Lorimer, W.S., Jr., Right Hepatolobectomy for Primary Mesenchymoma of the Liver: Ann. Surg., Feb., 1955)

15. The abdominal cysts occurring in infants and children are described, with a discussion of the pertinent pathological, clinical, and radiographic features of each. (Wilson, J.W., The Diagnosis of Abdominal Cysts in Infants and Children, Radiology, Feb., 1955)

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BUMED INSTRUCTION 5100.1 — 16 February 1955

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Stations Having Medical/Dental Personnel

Subj: Safe practice for hospital operating rooms

Ref: (a) BuMedInst 6270.1 of 19 Nov 1952
(b) BuMedInst 6700.6 of 14 Apr 1954 (NOTAL)
(c) BuShips Inst 9140.6 of 3 Sep 1954 (NOTAL)

Encl: (1) National Fire Protection Association Booklet No. 56 (1954)

This Instruction directs attention to the ignition hazards of flammable mixtures of combustible anesthetic agents, and to the measures applicable in the reduction and control of these hazards, as indicated in the National Fire Protection Association Booklet "Recommended Safe Practices for Hospital Operating Rooms."

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BUMED INSTRUCTION 4440.1A — 18 February 1955

From: Chief, Bureau of Medicine and Surgery
To: Ships and Stations Having Medical/Dental Personnel Regularly Assigned

Subj: Material to be reported as Equipment, Plant Property Class 3, and material to be carried and accounted for as minor equipment; instructions relative to

Ref: (a) NavComp Manual, Vol. 3, Chapters 6 and 7
(b) ManMedDept, Art. 25-3(3)

This Instruction insures that the administration of the plant property account and equipment records at addressed activities is in consonance with references (a) and (b). BuMed Instruction 4440. 1 is canceled.

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BUMED INSTRUCTION 6710. 6A 18 February 1955

From: Chief, Bureau of Medicine and Surgery
To: Commandants of Naval Districts and River Commands
Commandant, U. S. Marine Corps
Commander in Chief, U. S. Atlantic Fleet
Commander in Chief, U. S. Pacific Fleet
Commander, U. S. Naval Forces, Far East
Commander in Chief, U. S. Naval Forces, Eastern Atlantic and Mediterranean
Chief of Naval Air Training and Naval Air Training Command
Chief of Naval Airship Training and Experimentation
Commander, MSTS, Atlantic Area
Commander, MSTS, Pacific Area
Commander, MSTS, North Pacific Subarea
Commander, MSTS, Western Pacific Area
Commander, MSTS, Eastern Atlantic Area
Commander, MSTS, Mediterranean Subarea

Subj: Narcotic drugs; open purchase of

Ref: (a) Art. 92, Reg. No. 5 (Narcotics) Ch. VI, Treasury Dept.
(b) Art. 3-32, ManMedDept

Encl: (1) Excerpts from the Federal Register dtd Nov 30, 1954

This Instruction apprises addressees of a change to reference (a) regarding the purchasing of narcotic drugs by naval officers in the course of their official duties without registration and payment of special tax; and to decentralize to area levels the required certification therefor.

BuMed Instruction 6710. 6 is cancelled.

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BUMED INSTRUCTION 1770. 13 28 February 1955

From: Chief, Bureau of Medicine and Surgery
To: Distribution List

Subj: Remains of dependents of members of the uniformed services and dependents of civilian employees; disposition of

This Instruction promulgates instructions relative to care and disposition of remains of dependents of members of the uniformed services and dependents of civilian employees.

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BUMED NOTICE 6710 4 March 1955

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Stations Having Medical/Dental Personnel Regularly Assigned

Subj: Antibiotics; extension of potency dates

Ref: (a) Medical and Dental Materiel Bulletin (MDMB) Edition No. 51 of 1 February 1955
(b) Art. 25-21, ManMedDept.

This Notice provides authority to extend the potency dates of certain antibiotics.

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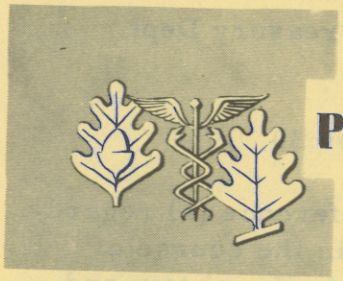

PREVENTIVE MEDICINE SECTION

Insect and Rodent Control

Yellow Fever on the Move

"Yellow fever has not been eliminated as a permanent threat to the United States." These were the words of Dr. Fred L. Soper, Director of the Pan American Sanitary Bureau, Regional Office of the World Health Organization, in reviewing the present status of this frequently epidemic disease. Its extent in the Americas, in the light of its history and epidemiology, was reviewed at a conference of top-level experts who met recently in a 2-day session in Washington at the Bureau's invitation.

Yellow fever seems of little international importance or concern, Dr. Soper said, until it suddenly appears in a port city, as it did last summer in Port-of-Spain, Trinidad. Then the picture changes overnight. There is great excitement; urgent and often unreasonable measures are taken; past epidemics are recalled; and interest in the disease as a public health menace is rekindled.

In 1928 and 1929 -- 20 years after yellow fever had been controlled and at a time when no apparent threat of reinvasion existed -- an urban epidemic of the disease occurred in Rio de Janeiro. Following the epidemic, the Brazilian Government embarked on a program to make all its cities and towns forever safe from this deadly scourge. The Aedes aegypti mosquito, the only urban vector of yellow fever, has now been eradicated from all the cities and towns of this huge country, larger by a tenth than the United States.

This information was brought out in the course of the conference, which reviewed the successful eradication campaigns in neighboring countries with the aid and encouragement of the Brazilian Government as an insurance against reinfestation.

On the recommendation of Brazil, the Pan Americal Sanitary Bureau, in 1947, initiated a continent-wide campaign to help governments eradicate A. aegypti from the Western Hemisphere. Today all of Brazil, Paraguay, Bolivia, Chile, Ecuador, and Peru have been declared free of this mosquito, and the campaign is well advanced in the rest of South America. The eradication campaign has begun in Mexico, Cuba, Haiti, the Dominican Republic, and in many Caribbean areas.

In Central America, Panama, Costa Rica, and Nicaragua have been declared free of A. aegypti. But north of the Nicaraguan border the picture changes. Small infested areas are found in El Salvador and Honduras, and a much larger one in Guatemala. The aegypti-infested area continues solidly along all of the Atlantic and Pacific coastal regions of Mexico, flooding into the United States, the only country in the Americas harboring A. aegypti that has not yet joined in the eradication campaign.

A line drawn from Yuma, Arizona, to the northeast corner of New Mexico, then across the country to the Atlantic at the boundary between North Carolina and Virginia marks the northern limit of the presence of the urban yellow fever mosquito in the United States. The infested area in the United States embraces the whole southern third of the country and has been declared by the U.S. Public Health Service a "receptive area," i.e., open to the introduction and transmission of yellow fever.

A. aegypti may be considered "domestic." In the Americas it is confined to the vicinity of human dwellings, breeding in artificial water containers. It is, therefore, easily controlled by the use of residual insecticides, such as DDT, which have greatly facilitated eradication. Unfortunately, there are other species of mosquities that also transmit the yellow fever virus; these live exclusively in tropical jungles. They

are found throughout the whole tropical belt of the Western Hemisphere. They infect monkeys, and probably infect certain marsupials, with yellow fever, thus keeping the virus alive and constituting a permanent reservoir and threat to humans who visit or live in the jungle areas. The only protection against the so-called jungle yellow fever is vaccination.

Jungle yellow fever is a direct problem of all the countries on the American mainland with the exception of Canada, the United States, Uruguay, and Chile. It moves in waves, dying down as it kills off or immunizes the monkey population, only to move on and flare up again a few or many years later. Such a wave has been moving slowly but steadily up through Panama and Central America since 1948, reviving old memories of the devastating epidemics that preceded the building of the Panama Canal. The present wave reached the northwest corner of Honduras in September 1954. Incidentally, no human case had been reported in Central America between 1924 and 1948.

This movement of jungle yellow fever northward is very significant and is fraught with grave danger, because it has approached close to the areas in North America still infested with the dread urban carrier, Aedes aegypti, the mosquito that can cause city epidemics. Once that small gap in Guatemala has been bridged, the threat of epidemics in cities and towns becomes immediate. Hence, the recent conference at which a comprehensive appraisal of the situation was made and measures to meet it were studied. Highly qualified technical experts at the conference actually predicted the movement of jungle yellow fever northward until it links with towns infested by the domestic mosquito.

The discussions stressed the necessity for broader and more concerted action to eradicate the remaining foci of Aedes aegypti from the Americas. No one country can consider itself safe when its neighbors have not cleaned house. As long as jungle yellow fever exists, there is always the possibility of the movement of an infected person from a jungle area into a city or town infested with the urban mosquito during the 6-day incubation period of the disease. Only when the eradication campaign becomes universal will all the American countries be freed of fear of reinfestation.

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Control of Bedbugs on Board Ship

1. Sleeping quarters should be inspected for bedbugs at regular intervals. Bedbug infestations are not necessarily associated with unclean situations. Because of the ability of these insects to cling to clothing and baggage, they are easily introduced into even the cleanest of places. Blood-stained bedding is often the first sign of an infestation. The bedbug's hiding

places include the seams of mattresses, the joints and springs of beds, upholstered furniture, lockers, crevices of walls and floors, and behind all items close to walls. Places habitually used for hiding may show staining and spotting. Bedbugs occasionally are mistaken for young cockroaches; however, bedbugs may be distinguished easily by their broader, flatter shape and by their slower movements.

2. Bedbugs are effectively controlled by the residual application of insecticidal sprays, i.e., applications of long-lasting insecticides to infested surfaces. Dusts may be used but are less effective. Neither fumigation nor space spraying should be used. The eggs are not destroyed by residual sprays, but the newly hatched bugs are. Infested bedding should not be destroyed because subsequent cleaning is all that is necessary to make it re-usable.

a. Insecticides.

(1) DDT, 5% in kerosene (GM51-1-157-295), is the insecticide of choice. One treatment with this material will protect spaces against reinfestation for 6 months or longer.

(2) If DDT-resistant bedbugs (see par. 2e) are encountered, the use of 0.5% lindane in kerosene is recommended. To prepare this material, use 20% lindane emulsion concentrate (G51-1-167-133), and dilute one part to 39 parts of deodorized kerosene (Military Specification MIL-K-3128). This mixture should always be freshly prepared, and excess stocks should be discarded. Equipment should be thoroughly cleaned after each application.

(3) Aqueous emulsions of DDT and lindane may be used where an extreme fire hazard exists or around materials that would be stained or otherwise damaged by oil. However, aqueous sprays seldom give satisfactory control of bedbugs.

b. Equipment.

(1) Either the ordinary "flit type" sprayer, 1-quart size (G41-S-4112), or the continuous sprayer, 3-quart size (G41-S-4120), may be used. Delivery is slow with this equipment. For faster work, use the standard 3-gallon compressed-air sprayer with a fanspray nozzle (GF41-S-4125).

c. Preparation of Quarters.

(1) Cover, or remove from the areas to be treated, all clothing, rubber material, and other objects which must be protected from applications of oils. Be certain that such items do not contain bugs.

(2) Set all movable items far enough away from walls to permit spraying the wall surfaces and the backs of furniture.

(3) Remove all contents of lockers and seabags to another location so that spraying work will not be hindered.

(4) Fold mattresses over once and place in the center of each bunk at a 45° angle.

d. Application.

(1) Begin at one end of the space and work around the room spraying all likely bedbug hiding places. Wet surfaces just to the point of run-off. This should include the backs and bottoms of all furniture and under cushions of upholstered furniture. It is unnecessary to spray the entire wall or ceiling because bedbugs are killed by crossing a 12 to 18-inch band of treated surface.

(2) Proceed along a row of bunks spraying one end of each bunk (principally spring coils and bunk corners) and one folded edge of each mattress. Return up the other side, spraying the other end of each bunk and mattress. It is not necessary to treat the flat surfaces of the mattresses. Fabric items should show a covering of minute droplets but should not be soaked.

e. Resistance to Insecticides. Numerous instances of bedbug resistance to DDT on U.S Navy ships and receiving stations were reported in articles in the 2 July 1948 and 13 November 1953 issues of the Medical News Letter. However, it should be borne in mind that trouble in eradicating bedbug infestations on board ship is more likely to result from improper treatment than from the presence of resistant bugs. If careful use of the techniques outlined in the preceding sections does not effect control, the assistance of specialized insect and rodent control personnel should be sought, as prescribed in BuMed Instruction 6250.4.

f. Precautions. Personnel responsible for the mixing, application, and storage of insecticides should be thoroughly familiar with the precautions and restrictions outlined in Chapter 10 of the Manual of Naval Preventive Medicine, in Section 02205 of the U.S. Navy Safety Precautions Manual, and in applicable Bureau of Medicine and Surgery Instructions of the 6250 series. Specific precautions to be used in shipboard bedbug control procedures are:

(1) Prohibit open flames, including smoking, in treated areas for at least 6 hours following treatment.

(2) Air spaces thoroughly both during and following treatment.

(3) Do not use lindane formulations in over-all residual treatments.

(4) While applying insecticides, wear appropriate protective breathing devices. Respirator, twin-cartridge (chemical), half-mask, Type B-2, (Stock No. G37-M-314) is recommended. If clothing becomes wet with spray, take a soap and water bath immediately and change clothing.

(5) Comply with regulations contained in the Manual of the Bureau of Ships, 30-4, for the use and storage of kerosene on board ships. Specifically all kerosene-based insecticides should be stored in the paint and inflammable liquid storeroom. When kerosene solutions of insecticides are used as residual sprays by trained personnel, it is assumed that no explosion hazard exists unless open flames or temperatures exceeding 100° F are present. However, recommended fire-prevention practices should be observed at all times. (Kenneth L. Knight, CDR (MSC) USN, Preventive Medicine Division, Bureau of Medicine and Surgery.)

Industrial Medicine

The McIntyre-Saranac Conference on Occupational Chest Disease

The McIntyre-Saranac Conference on Occupational Chest Disease was held from February 7th through February 9th at Saranac Lake, New York, a town with a population of 7000 in the Adirondack Mountains.

The conference was conducted under the joint auspices of the Saranac Laboratory, New York, and the McIntyre Foundation of Toronto, Canada. These two organizations are carrying on extensive research in occupational chest diseases.

Upward of two hundred persons attended the conference, coming from various points in the United States, Canada, England, South Africa, and India. The majority were industrial physicians. Also, in the assemblage were industrial engineers, hygienists, chemists, and statisticians.

Papers were read showing the effects on pulmonary tissues of inhalation of dust composed of the following substances: silica, coal dust and silica, talc, beryllium compounds, asbestos, radioactive dust particles, chromium compounds, rare earth oxides and fluorides, tungsten carbide, cobalt, and glass wool.

Detailed histories on individuals exposed to the inhalation of the above-mentioned dusts were given. Serial roentgenograms of chests and photomicrograms of lung tissue sections were projected on a large screen demonstrating pathology in chests and showing lung tissue histopathology. Many of the dusts inhaled caused peribronchial or periarterial fibrosing throughout the lung fields. This resulted in the following physical manifestations: lowering of normal lung function; dyspnea and fatigue on exertion; clubbing of the fingers; and cor pulmonale (right side heart failure).

The following preventive measures were recommended to protect individuals, working in dust-hazardous occupations, against pneumonoconiosis: proper ventilation; adequate dust control measures (masks, water, et cetera).

A good medical program (periodic physical examinations and chest x-rays with removal of those persons showing signs or symptoms to dust-free occupations).

Use of aluminum dust as a prophylaxis to prevent silicosis. This treatment is not unanimously accepted. It is, however, presently used in some parts of the United States, Canada, Wales, and South Aftica.

It is well to mention that, despite all the work that has been done, there are at present no set laboratory tests that will accurately determine the extent of physical disability produced by pneumoconiosis. This causes much difficulty in settling workmen's claims for disability compensation.

Arrested cases of pulmonary tuberculosis should not work in dust-hazardous areas. Silicotic persons are very susceptible to pulmonary tuberculosis.

Some naval industrial activities employ civilian and military personnel in dust-hazardous occupations such as sand blasters, grinders, moulders and shakers, drillers, and road and aircraft landing strip builders, et cetera.

Naval medical personnel engaged in occupational health programs should take every possible precaution to safeguard the health of persons working in these areas through adequate preventive measures. (Captain L. B. Shone (MC) USN, Preventive Medicine Division, Bureau of Medicine and Surgery)

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Rescue Breathing Apparatus

It has been noted during inspections that many ships are not observing the required safety precautions for rescue breathing apparatus and canisters. The BuShip's Manual, Chapter 93, and the U. S. Navy Manual of Safety Equipment (NavExos P-422) clearly define the purpose, use and care of this apparatus. Pertinent parts of NavExos P-422 are quoted herein for information and guidance.

"Par. 120. Three models or types of the Navy rescue breathing apparatus have been developed. These types are designated as Type A Type A-1, and the Patrol Type. Subsequently, the best features of Type A and the Patrol Type were combined in Type A-1, and most apparatus of the other types in service have been rebuilt into Type A-1. Moreover, all new equipment for supply to the Navy is of the A-1 Type.

"Par. 121. The apparatus, by means of a canister of chemicals, generates oxygen, supplies oxygen to the wearer, and purifies the exhaled air so that the oxygen in the exhaled air can be rebreathed. The apparatus, as in the compressed oxygen types, forms with the lungs, windpipe, throat, and mouth of the wearer, a closed, self-sustaining system, when the canister is in place. For proper functioning, the system must have not only air that is in the lungs of the wearer when he puts on the apparatus, but also a supply of air for use in the lungs, plus the air that is being purified, recharged with oxygen, and cooled. Obviously, more air is needed than just enough for two or three breaths. The air required to fill the system in sufficient quantity to maintain the supply to the lungs (and to actuate the chemicals in the canister) is drawn into the apparatus by the wearer. To do this, the wearer first compresses with one hand the two breathing tubes tightly enough to close them as passageways for air; with the thumb of the other hand, he presses the stem of the hand-operated valve to open it (the 'starter valve' sets just below the face-piece) and takes a deep breath. He then releases the valve and his grip on the breathing tubes, and exhales into the apparatus. This is repeated until the evolution of oxygen is well

started, as indicated by the heating of the canister. Usually 15 exhalations into the apparatus will be sufficient. During time when starting breaths are made, there may be an accumulation of air in the system, in which case the wearer may become uncomfortable from excess pressure. To release the excess pressure, the edges of the face-piece should be lifted away from the face momentarily or the pressure should be released through the release valve on the face-piece.

"Par. 125. The design of the canister is such that, if it is used immediately after the seal is broken, sufficient oxygen will be supplied to last one hour under moderately hard working conditions.

"Par. 126. Isolated cases have occurred where the actual life of the canister was considerably less than one hour; and in some cases there was undue resistance to breathing at the outset. Investigation indicated that the chemical, being inherently soft, had through abrasion developed fines (finely crushed chemicals) which from vibration and storage of the canister in an upright position had settled on the bottom screen. The layer of fines had solidified after the apparatus had been used for only a few minutes, making it increasingly difficult to breathe. The difficulty of excessive resistance of new canisters when encountered in the service may be overcome by lightly tapping the bottom of the canister on the deck. In most cases this will separate the fines that form on the bottom screen. Canisters are packed horizontally in the packing boxes for shipping instead of vertically as in the past. When received, they should be stored Horizontally With The Concave Side Down.

"Par 127. So that the wearer may be able to tell how much service time is left in the canister, a timing device is provided on the apparatus in a position where it may be easily seen at all times. The dial is calibrated in minutes, and provision is made for interval setting . . . Regardless of whether the dial is set for an interval of minutes or for a full hour (less 3 minutes as a margin of safety), a bell will ring as a warning when the time has expired.

"Par 128. When the warning bell rings (or before, if breathing becomes difficult), the wearer must go at once to the fresh air. When a canister is replaced with a new canister, the initial procedure of inflating the apparatus by inhaling 15 times into it must be repeated."

Expended or damaged canisters should be punctured in several places and thrown over the stern of the ship as soon after use as practicable. This disposal should not be made, however, if any gasoline or oil is evident on the surrounding surface, as the heat of the explosion may be sufficient to ignite the oil or gasoline. If they are buried in the ground, they should be placed at such depth that they will not be likely to become uncovered.

To Clean Breathing Apparatus. Face-pieces of rescue breathing apparatus are now being made of synthetic rubber. Most disinfectants have a damaging effect on this material as well as on the plastic lenses of the face-piece. If such solutions were introduced into the canister, a

violent reaction of the chemical would result. Only Mild Soap and Water should be used in the cleaning of face-pieces and other parts of the apparatus. While the face-piece and breathing tubes are being cleaned, the canister shall be removed and shall not be replaced until the parts of the apparatus are thoroughly dry.

Caution. It has been found that the disc of the face-piece exhalation valve will stick to the valve seat if saliva is not cleaned out of the face-piece. Therefore, it is necessary to wash and dry these valves after each use.

To Clean and Disinfect Respirators. Respirators, particularly the face-pieces, should be scrubbed daily after use with warm water and soap. This not only is a good hygienic practice but also prolongs the life of the rubber. Respirators should also be disinfected at regular intervals. If a respirator is worn by the same person, disinfection once each week should be satisfactory, depending on the condition of use and the thoroughness of the daily cleaning with soap and water. A respirator that has been worn must always be disinfected before being used by another person.

Common disinfectants such as alcohol and cresol solutions are acceptable. Disinfection can be accomplished as follows: Alcohol: immerse respirator in 70% solution for 10 minutes. Cresol: immerse respirator in 2% solution for 10 minutes. Formalin: immerse respirator in a solution of 40% formaldehyde added to nine parts water.

Caution. When these solutions are used, the face-piece, and particularly the parts that come in contact with the skin, should be rinsed throughly with water. Some people are highly sensitive to these chemicals. (ComServPac Information Bulletin, Force Medical Section, Cumulative Edition 1953)

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